

Characterization of Forearm Muscle Fatigue Indicators in Tennis Forehand

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Background:

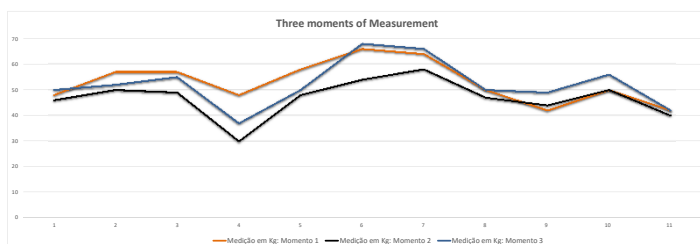
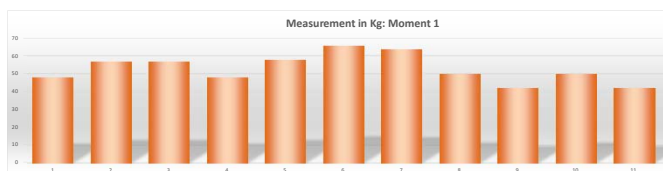
Tennis is a racket sport that comprises the execution of repetitive movements of varying intensities during a variable period of time. The same player can be involved in matches with diverse lengths, enduring movements that involve changes in direction, type of stroke, and variations in acceleration (1). During a match, high-intensity repetitive movements may lead to muscle fatigue, which is expected to reduce the precision of the stroke in 81%. The decrease in muscle maximal strength or power may lead to a change in technical aspects and reduce the reaction time. These factors are crucial on the performance of professional players and their results (2).

Objectives:

The purpose of this paper was to analyze if there are any changes on the strength pattern of forearm muscles that may be caused by fatigue during the forehand stroke in tennis.

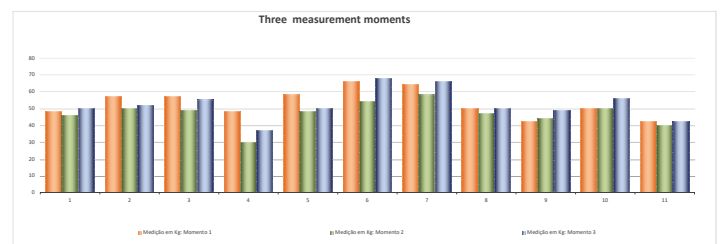
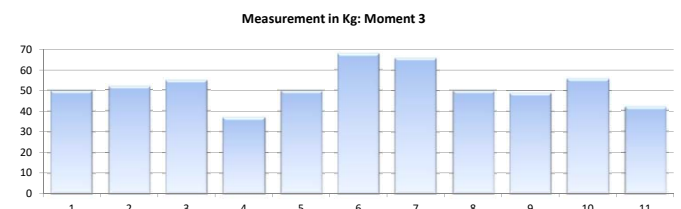
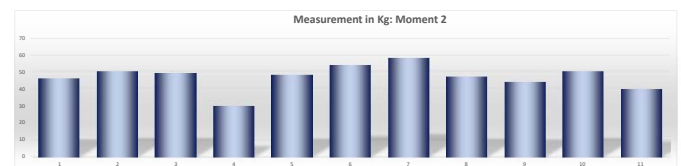
Results:

A total of 11 athletes were evaluated, which participated on average for 18.18 (± 7.17) tournaments per year. For the hand grip strength, mean and standard deviation values were 52.91 ± 8.11 after the warm-up period; 46.9 ± 7.36 after the training period, and 52.3 ± 9.07 after the resting period. Statistical significant differences ($p < .001$) were found between the warm-up and training periods and between the training and resting periods, with no differences between the warm-up and resting periods.



Methods:

Our sample was obtained from the Portuguese Tennis Federation (FPT) and the International Tennis Federation (ITF). Only male professional athletes, aged between 16 and 25, who trained 5 days a week, had been playing tennis for at least 8 years, and had no previous history of epicondylitis, were included in our sample. Data collection was conducted on an indoor tennis court located at the Jamor Tennis Complex (Oeiras, Portugal). Initially, each athlete participated in a warm-up activity (running and active mobilization of the upper limbs). This was followed by a training period of 25 forehand strokes in a row. A Jamar dynamometer was used to evaluate the hand grip strength on three different moments (3): The first, immediately after the warm-up period; the second, after the training period; and the third, 15 minutes resting period, where each participant had to perform a maximal voluntary contraction for 3 seconds. All participants gave their informed consent in writing prior to inclusion in the investigation.



Conclusion:

It has been found that there are differences on the pattern of forearm muscle strength development, which may indicate the onset of muscle fatigue after 25 forehand strokes, but these differences seem to be attenuated after a 15-minute resting period.



References:

1. Kovacs MS. Tennis Physiology - training the competitive athlete. *Sports medicine*, 2007;37(3),189-198.
2. Davey PR, Thorpe RD, Williams C. Fatigue decreases skilled tennis performance. *Journal of Sports Sciences*, 2002;20:4,311-318.
3. Moreira D, Alvarez RR. A. Evaluation of the palmar prehension strenght using Jamar® dynamometer in Hansen's Disease patients attended in ambulatorial level in Federal District. *Hansenologia Internationalis*, 2002;27(2),61-69.

